U.S. Department of Transportation
Research and Special Programs Administration

OCT 26 1995

400 Seventh Street, S.W.
Washington, D.C. 20590

DOT-E 6484
(FIFTH REVISION)

EXPIRATION DATE: October 1, 1996

(FOR RENEWAL, SEE 49 CFR SECTION 107.105)

1. GRANTEE: Angus Chemical Company
Buffalo Grove, IL.

(See Appendix D to this document for a list of additional grantees)

2. PURPOSE AND LIMITATION: This exemption authorizes the transportation in commerce of mixtures of nitromethane and various solvents, as Flammable liquids, n.o.s., or Combustible liquids, n.o.s. in tank motor vehicles. This exemption provides no relief from any regulation other than as specifically stated herein.

3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.

4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR Section 172.101, Table, Column (8C).

5. BASIS: This exemption is based on the application of Angus Chemical Company dated January 21, 1993 and supplemental letters dated September 22, 1995 and October 19, 1995, submitted in accordance with 49 CFR 107.103 and the public process thereon.

6. HAZARDOUS MATERIALS (49 CFR 172.101):

A. The following Nitromethane mixtures, shipped as Flammable liquid, n.o.s., Class 3 materials, Packing group II.

a. Diluent	Minimum % of Diluent by Weight	Maximum Consumption Rate cm/sec,
1, 2-Butylene oxide	40	0.020
Cylclohexanone	25	0.027
1, 4-Dioxane	35	0.027
Methanol	45	0.031

Methyl Chloroform	50	0.034
1-Nitropropane	48	0.031
2-Nitropropane	47	0.030

b. Diluents and % by Weight	Minimum % of Diluents by Weight	Maximum Consumption Rate, cm/sec. (see APPENDIX C)

*Not more than 30% Aromatic

Petroleum Hydrocarbon

Solvent and:

i. Not less than 48% 1-Nitropropane	75	0.035
ii. Not less than 47% 2-Nitropropane	75	0.035
iii. Not less than 48% 1 and 2-Nitropropane blended	75	0.035

*Must comply with specifications provided in application.

c. Diluents and % by Weight	Minimum % of Diluents by Weight	Maximum Consumption Rate, cm/sec (See Appendix C)
Nitromethane 31% by weight	69	0.035
Nitroethane 31% by weight		
1-Nitropropane 38% by weight		

B. Nitromethane blended with a minimum of 50% 1,1,1-Trichloroethane (Methyl chloroform), shipped as a Combustible liquid, n.o.s., classed as a combustible liquid, Packing group III.

7. PACKAGING AND SAFETY CONTROL MEASURES: Packagings prescribed are as follows:

a. DOT Specification MC-307 or MC-312 tank motor vehicles having a maximum capacity of 6,000 gallons and constructed of stainless steel with a molybdenum concentration not over 0.5% for the base metal and welded areas. Welding must have been performed by the inert gas shielding process.

b. Tanks must be clean bore with no compartmenting or baffling permitted. Means of access for the complete visual inspection must exist. No outlets, inlets, or access ways are permitted except at the top of the tank. The tanks must be uninsulated and must have no heating coils. Gasketing must be of non-metallic material which is compatible with nitromethane and its mixtures.

c. Tanks must be capable of being sealed to prevent loss of nitrogen blanket (padding) or ingress of air. The maximum head and shell thickness may not exceed 0.172-inch and 0.27-inch, respectively unless otherwise specified in §178.342-2 or §178.343-2 to meet minimum requirements.

d. Maximum filling allowed for cargo tanks is 85 percent by volume at product temperature of 70°F.

8. SPECIAL PROVISIONS:

a. Special Commodity Requirements.

(i) For purposes of the regulations and this exemption, shipments must be offered for transportation described as "Flammable liquid, n.o.s. Class 3" (UN1993) or "Combustible liquid, n.o.s." (NA1993), as appropriate.

(ii) The mixtures must be completely miscible and not subject to stratification or fractionation in the temperature range of minus 40°F to plus 140°F.

(iii) The mixtures must be capable of exhibiting a zero card gap by the modified card gap test described in Appendix A.

(iv) The mixtures must be capable of producing a plate height no greater than 13 feet in the CSC modification of the heavy confinement cap test described in Appendix B.

(v) The consumption rate may not exceed that shown in paragraph 3, when measured as described in Appendix C using air as a pressurant at 1600 psig. There must be no ignition of this material when tested under the same conditions in a nitrogen atmosphere of 1600 psig.

(vi) The shipper and carrier must work out a mutually agreeable arrangement with regard to sampling the container contents prior to shipment. A copy of the result of any and all testing analyses made on these samples is to be retained by the shipper and made available to the Department of Transportation upon request.

b. Special Transportation Requirements.

(i) A nitrogen blanket (padding) is required to be maintained at all times during loading, transportation, and unloading of the tank. The nitrogen must be of a purity which will assure the absence of any organic matter or other substance which is incompatible with or could sensitize the contents of the container. A minimum nitrogen blanket (padding) pressure of 1.0 psig must be maintained at all times during transport (delivery and return). All practical measures must be taken to prevent the possibility of air entering the containers.

(ii) Only centrifugal pumps are authorized for loading or unloading of the mixture if nitrogen pressurizing is not used for this transfer. The use of air pressure for transferring the mixtures is prohibited.

(iii) Cargo tanks must be cleaned completely, visually inspected, and purged free of air by nitrogen prior to each loading except when mixtures containing the same diluent are to be shipped in the next loading. For the purposes of this paragraph, mixtures containing 1-nitropropane or 2-nitropropane are considered interchangeable. In these instances the residual cargo from previous loading is to be checked prior to the next loading. If there is any evidence of contamination, the cleaning, inspecting and purging procedures must be carried out. In any event, no more than five (5) consecutive loads of the same product are to be transported without going through the same procedures. If a rinsing of the tank is necessary, the final rinsing solution should be of the mixture to be shipped.

(iv) Cargo tanks are to be used exclusively for products specified in paragraph 3 herein except that Methyl Chloroform may be transported subsequent to each movement of Nitromethane-Methyl Chloroform mixture and Butylene Oxide may be transported subsequent to each movement of Nitromethane - Butylene Oxide mixture.

(v) Each shipment must be consigned and delivered at one location; partial unloading is not permitted.

(vi) A current copy of this exemption must be carried aboard each motor vehicle.

(vii) Each cargo tank must be reinspected and retested in accordance with 49 CFR 177.824 except compliance with subparagraph (c)(4) is hereby waived.

(viii) Each cargo tank must be plainly marked on the right side near the front, in letters at least two inches high on a contrasting background, "DOT-E 6484".

9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle.

10. MODAL REQUIREMENTS:

A copy of this exemption must be carried aboard each motor vehicle used to transport packages covered by this exemption.

11. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this exemption and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. Section 5101 et seq:

- All terms and conditions prescribed in this exemption and the Hazardous Materials Regulations, 49 CFR Parts 171-180.
- Registration required by 49 CFR 107.601 et seq., when applicable.

No person may use or apply this exemption, including display of its number, when the exemption has expired or is otherwise no longer in effect.

12. REPORTING REQUIREMENTS: The carrier is required to report any incident involving loss of packaging contents or packaging failure to the Associate Administrator for Hazardous Materials Safety (AAHMS) as soon as practicable. (49 CFR 171.15 and 171.16 apply to any activity undertaken under the authority of this exemption.) In addition, the holder(s) of this exemption must inform the AAHMS, in writing, of any incidents involving the package and shipments made under the terms of this exemption.

Issued at Washington, D.C.:

OCT 26 1995

Alan I. Roberts
Associate Administrator
for Hazardous Materials Safety

(DATE)

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Research and Special Programs Administration, Department of Transportation, Washington, D.C. 20590. Attention: DHM-31.

The original of this exemption is on file at the above office. Photo reproductions and legible reductions of this exemption are permitted. Any alteration of this exemption is prohibited.

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APPENDIX A

Modified Card Gap Test

To pass this test a material must exhibit a zero card gap when tested in the same manner in which commercial nitromethane containing a minimum of 95% by weight nitromethane and a minimum of 99% by weight nitroparaffins exhibits a value of 20 or more cards. That is, commercial nitromethane must be separated from the booster used by at least 0.20 inches of cellulose acetate or its equivalent, before probability of its detonation is reduced to 50% or less.

The procedure to be used is that described by R.W. Van Dolah et al, U.S. Bureau of Mines, Pittsburgh, Pennsylvania in Compt. rend, congr. intern. chim. ind. 31e, Liege 1958, 1/4Pub. as Ind. chim. belge, Suppl. 2, 210-15 (Pub. 1959) (in English)1/2 except the tetryl Army Ordnance pellets used are not readily obtained, so an appropriate weight of the commercially available explosive, 50/50 pentolite, may be substituted.

APPENDIX B

CSC-Modified Heavy Confinement Cap Test Method

"A 4ml sample of diluted nitromethane mixture is placed in a 13 mm O.D. by 100 mm long Pyrex test tube.

The test tube is lowered into a 1-inch diameter hole drilled 4 inches deep at the center axis of a cylinder of cold-rolled steel 5 inches minimum diameter and 6 inches long. The face of the block is grooved by a single radial cut 1/8" wide and 1/16" deep. The borehole block is placed on a level base, which should be non-yielding under the force of the test tube, with the axis of the borehole vertical and the opening directed upward.

A No. 8, seismographic-type electric blasting cap (instantaneous) is lowered into the diluted nitromethane until the end of the cap touches the bottom of the test tube. The electric leads should be threaded through the 1/8" x 1/16" groove in the top of the block.

The mouth of the borehole is then closed and the sample confined by a 5-pound steel test weight. The weight is to be cylindrical, having a diameter of approximately 2 3/4 inches and a length of about 3 inches.

The test sample should be within the temperature range of 851/4 ± 51/4F. at the time of firing.

Measurement of height to which the test weight is thrown can be observed visually by placing a vertical measuring board which has one-foot divisions marked on its face immediately behind the borehole block. Heights above about 20 feet may be more conveniently determined by calculation from the time of the flight of the test weight from explosion of the cap to impact of the weight on the ground. A stop watch may be used to measure the time.

Five replicate tests are the minimum number which should be made to establish a value of the test height for a given material.

The high chamber pressure produced by cap and sample causes a gradual enlargement of the borehole. The initial borehole volume should be 52 ± 1 ml. Blocks should be discarded when, after repeated usage, the volume of the borehole has increased to over 55 ml.

Apparatus and technique can be checked by running tests with commercial nitromethane, 95% by weight minimum purity, which should yield an average height in excess of 40 feet."

APPENDIX C

Bureau of Mines Self-Sustained Burning-Under-Pressure Test Method*

The sample mixtures are placed in Pyrex glass tubes, 12.6 mm I.D. by 9 cm long with 1.2 mm wall sealed at the bottom and mounted in a pressure vessel with an observation window in such a way that it can be centered close to the window.

The Pyrex tubes are filled to within 1 cm of the top. An igniter, consisting of a short length of 0.020-inch diameter Nichrome wire threaded through a disc of ANP** propellant weighing approximately 5 mg, or its equivalent, is fitted into the top of the tube within 2 mm of the liquid surface.

The pressure vessel is then pressurized with compressed air (or nitrogen) to 1600 psig. and the igniter electrically initiated. Pressure is to be held at 1600 psig. during combustion of the sample by means of an automatically operated back-pressure regulating valve, which vents combustion products, as required to maintain constant pressure.

Combustion rate can be measured with a stop watch, visually observing movement of the flame front over the 5 or 6 cm central portion of the sample tube, or it can be determined by motion picture photography.

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* The procedure is based upon one used by the Safety Research Center, Bureau of Mines, Pittsburgh, Pennsylvania, and described in their Final Report No. S-4108. Contract No. 14-09-0050-3095, November 7, 1969.

** ANP is an ammonium perchlorate, aluminum and polyurethane binder rocket propellant which provides an intensely hot ignition source.

APPENDIX D

The following are hereby granted party status to this exemption based on their applications submitted in accordance with 49 CFR 107.111 and the public proceeding thereon or 107.105, as appropriate:

Company Name City/State	Application Date	PTE #	Issue Date
Dow Chemical Co. Freeport, TX	March 30, 1993	1	OCT 26 1995
Texas Allied Chemicals, Inc. San Antonio, TX	July 6, 1993	2	OCT 26 1995
InterTrans Services, Inc. Monmouth Beach, NJ	August 14, 1993	3	OCT 26 1995

Alan I. Roberts
Associate Administrator for
Hazardous Materials Safety